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COMPLETE SPECIFICATION

Improvements in or relating to Refrigerators

I, GUYON LOCKE CROCHERON EARLE, a citizen of the United States of America, of 37, Greenway South, Forest Hills, Long Island, New York, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This application relates to refrigerators and more specifically to refrigerators adapted for special situations where the standard box-type refrigerator is not satisfactory.

It is an object of this invention to provide novel mechanical refrigerators.

It is another object of this invention to provide mechanical refrigerators having novel shapes.

It is still another object of this invention to provide novel combinations involving refrigerators and other articles.

According to the invention there is provided a refrigerator unit comprising a lower enclosure member having a back wall, side walls and a front wall, an upper enclosure member located above said bottom enclosure member and having a back wall the rear plane of which is in front of the rear plane of the bottom enclosure member, side walls and a front wall, each of said enclosure members having a space adapted to be refrigerated, an evaporator, at least a large portion of which is located in said upper enclosure member, and means including said evaporator for causing both of said enclosure members to be refrigerated, said last-mentioned means including a member angularly positioned with respect to the horizontal for deflecting cold air from said evaporator to the rear portion of said lower enclosure member which is behind an extension of the rear plane of the upper enclosure member.

In the usual kitchen arrangement, the refrigerator is of the box type, that is, the front of the refrigerator is substantially in a plane which is parallel to the plane of the rear. While refrigerators

of the "set-back" type have been used, that is, a refrigerator wherein the front plane of the upper portion of the refrigerator (containing the evaporator) is behind or set back from the plane of the front of the lower portion of the refrigerator, (see for example, British Specification No. 581,121), in each of these the rear plane of the upper refrigerated portion has been a continuation of the rear plane of the lower refrigerated portion or a plane at the rear of the latter. In either situation, the cold air from the evaporator is deflected forwardly into the front of the lower portion of the refrigerator.

Special cases arise, however, when, in order to utilize to the maximum extent the limited space available in small apartments or houses or in boats, none of these refrigerators is an entirely satisfactory solution to the problem. The present invention, in some of its more important aspects, relates to the solving of some of these special problems. In all of the refrigerators provided in accordance with this invention, the rear plane of the lower portion of the refrigerator is located behind the rear plane of the upper portion thereof for reasons which will now be made clear.

In apartment houses, the room layout is often such that a kitchen wall of one apartment abuts a bathroom wall of that apartment or of another apartment. Kitchen space in apartment houses is always at a premium and it is desirable to provide as large a refrigerator as space will permit. In accordance with one exemplary embodiment of the invention, the rear part of the lower refrigerated portion of a "setback" refrigerator is set back into the wall between the kitchen and the bathroom so as to utilize at least a portion of the space under the basin in the latter, which space is usually wasted. Thus, a refrigerator of larger "cubic footage" can be provided without taking up any more wall or floor space in the kitchen. If desired, a

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sink can be mounted in the table top member, over all or a portion of the lower part of the refrigerator covered by the table top. Also, the refrigerator can
5 form part of a unit which includes a stove.

The invention is also capable of being used in motor boats or in other places where, due to the presence of a deck or
10 other horizontal member, the vertical wall space is limited. In accordance with another exemplary embodiment of the invention, a refrigerator is provided
15 which has a lower portion which projects to the rear of the upper portion and extends under the deck or other horizontal member. The front of the upper portion can be in the same plane as the front of the lower portion or in a different plane.
20 By this means, a refrigerator of very comfortable capacity can be fitted into a space that is entirely unsuited to a box-type refrigerator of the same capacity.

The invention will be more readily understood by referring to the following description taken in conjunction with the accompanying drawing forming a part thereof, in which:

Fig. 1 is a side elevation view, with portions broken away, of one embodiment of the invention;

Fig. 2 shows a second embodiment of the invention;

Fig. 3 shows in perspective a modification of the arrangement shown in Fig. 1; and

Fig. 4 is a sectional view of the arrangement of Fig. 3.

Referring more specifically to the drawing, Fig. 1 shows as one example of the invention, a kitchen and bath room arrangement of refrigerator 10 and basin 11 suitable for small apartments. Fig. 1 is a side view with portions in cross-section.
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The refrigerator 10 preferably comprises a lower refrigerated portion 20 supported on a recessed base 21, an upper refrigerated portion 22 located above the lower portion 20 but the front plane of which is set back from the front plane of the lower portion 20 and a table top member 23 of stainless steel or monel metal, for example, positioned above
50 that part of the lower portion which juts out in front of the upper portion 22.

The upper portion 22 comprises an insulated enclosure member containing an evaporator 30, the coils of which surround ice cube trays 31, 32, and 33 and which are connected to the compressor unit (not shown) which may be located under the lower portion of the refrigerator or at the side thereof. One or more
60 doors 34 provide access to the upper por-

tion 22. Shelves may also be provided in the upper portion at the side of the evaporator. The back of the upper portion is preferably placed contiguous (or nearly so) the wall 35 between the
70 kitchen 12 and the bathroom 13.

The lower portion 20 of the refrigerator comprises an insulated enclosure member, the back wall 37 of which is positioned well behind the back wall 36
75 of the upper portion 22. The back wall 37 is preferably placed contiguous (or nearly so) the wall 38 between the kitchen 12 and the bathroom 13 which wall forms part of a protuberance or bulge in the
80 wall 35. Above this bulge is placed, for example, the basin 11. It is obvious that the invention is not limited to any specific type of fixture or article which is placed above the bulge in the wall 35
85 nor need the room adjoining the kitchen be a bathroom. The important thing about this aspect of the invention which should be kept in mind is that space in a room other than the kitchen (which space
90 has little or no value) is utilized to make possible the use of a refrigerator of larger capacity than would otherwise be possible.

The lower portion 20 may be provided
95 with one or more doors or drawers. The drawing shows, by way of example, four drawers 41, 42, 43 and 44 but obviously more or less than this number can be provided, if desired. The bottom drawer
100 44 is preferably longer than the others so that a rapid circulation of cold air can be maintained behind the upper drawers as disclosed in British Specification No. 581,121. The upper drawers can be of
105 the same length (horizontal distance measured from the front) or they can be of gradually increasing lengths from top to bottom as shown in Fig. 1. If desired
110 all of the drawers below the top one can be of the same length. To deflect the cold air from the evaporator to the rear of the lower portion, the angularly disposed deflecting member 50 is provided
115 while a similar member 51 can be utilized to deflect cold air to the front of the lower refrigerated portion. Still another means of obtaining refrigerated air in the lower portion of the refrigerator is to place mesh or grill cages 52, 53,
120 and 54 in one or more of the three upper drawers over mesh or slit portions in the respective drawer bottoms so that cold air from the evaporator can reach a
125 drawer or drawers under the top one. The purpose of the mesh cages is to prevent the storage of food in a small portion of each drawer so that the flow of cold air to the lower drawers is unimpeded. A vertical partition member 60
130

is placed in each of the cages 52, 53 and 54 to cause the cold air to be deflected to both the front and rear of each drawer. If only one mesh cage is provided it should be placed in the top drawer. In addition, cold air is distributed by conduction when the drawers are of metal and by radiation. Thus both the upper and lower portions of the refrigerator are refrigerated regardless of its "unusual" shape. Any suitable drawer structure can be utilized; see, for example British Specification No. 581,121.

Fig. 2 illustrates another embodiment of the invention. In this arrangement there is provided a refrigerator having an upper refrigerated portion 61 and a lower refrigerated portion 62 the back wall 63 of which is placed at the rear of the back wall 64 of the upper portion 61. The lower portion 62 is adapted to project between two horizontal members 65 and 66 separated by a distance which is less than the total height of the refrigerator. By way of example, the two members 65 and 66 can comprise an upper and a lower deck of a motor boat 67, a portion of which is shown in cross-section in Fig. 2.

The front of the upper portion 61 of the refrigerator, which contains an evaporator 30 enclosing ice cube trays 31, 32 and 33 can be set back from the front of the lower portion 62, as in the arrangement of Fig. 1, or it can be in substantially the same plane as that containing the front of the lower portion. The lower portion preferably contains drawers 41, 42, 43 and 44 as in Fig. 1 containing, if desired, one or more of the mesh cages 52, 53 and 54 as in Fig. 1. Deflecting members 68 and 69 are provided to deflect cold air from the evaporator toward the rear of the lower portion 62. By this means, a cold air circulation is set up behind each drawer and in each drawer. The advantages of the arrangement of Fig. 2 will be readily apparent were it not for the unusual shape of the refrigerator of this invention the space between the decks 65 and 66 could not be utilized to maximum advantage.

Figs. 3 and 4 show another embodiment of the invention, Fig. 3 being a front perspective of a kitchen unit including a refrigerator, a stove and a sink, while Fig. 4 is a sectional view taken along line 4-4 of Fig. 3. In these two figures, members or elements which have the same reference characters as corresponding members or elements in Fig. 1 are similar to them and have similar functions.

The unit 70 of Fig. 3 comprises a re-

frigerator unit 71, a sink or basin 72 and a stove 73. The unit 71 is like that shown in Fig. 1 except that the top drawer 41 is placed a little lower than in the arrangement shown in that figure to permit the sink or basin 72 to be placed in the table top 23 in front of the refrigerator or partially in front of the refrigerator and partially in front of the stove as shown in Fig. 3. The stove 73 comprises two or more burners 74 set in the table top, an upper oven 75 and a lower oven 76. The refrigerator and stove are well insulated to prevent heat transfer between them. The rear of the lower portion of the stove may be in the same plane as the back wall 37 or in front of this. The unit of Fig. 3 is readily adaptable to small apartment kitchens or to galleys of motor boats, for example.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A refrigerator unit comprising a lower enclosure member having a back wall, side walls and a front wall, an upper enclosure member located above said bottom enclosure member and having a back wall the rear plane of which is in front of the rear plane of the bottom enclosure member, side walls and a front wall, each of said enclosure members having a space adapted to be refrigerated, an evaporator, at least a large portion of which is located in said upper enclosure member, and means including said evaporator for causing both of said enclosure members to be refrigerated, said last-mentioned means including a member angularly positioned with respect to the horizontal for deflecting cold air from said evaporator to the rear portion of said lower enclosure member which is behind an extension of the rear plane of the upper enclosure member.

2. A refrigerator unit according to claim 1, in which the means for causing both enclosure members to be refrigerated also includes a second deflecting member angularly positioned with respect to the horizontal for deflecting cold air from the evaporator to the front portion of the lower enclosure member.

3. A refrigerator unit according to claim 1 or 2, in which the deflecting member is vertically arranged.

4. A refrigerator unit according to claim 1 or 2, in which the deflecting member makes an angle with the horizontal of less than a right angle.

5. A refrigerator unit according to any one of the preceding claims, including a plurality of drawers in the lower mem-

- ber, at least the upper one or ones of said drawers having an opening or openings in the lower part thereof to permit cold air from the evaporator to reach a drawer
- 5 or drawers under the top one and at least the bottom drawer extending behind an extension of the rear plane of the upper enclosure member.
- 10 6. A refrigerator unit according to claim 5, including a mesh cage positioned above the opening or openings.
7. A refrigerator unit according to claim 5 or 6, including means for deflecting cold air in a generally horizontal
- 15 direction both in front of and to the rear of the opening or openings.
8. A refrigerator unit according to claim 7, in which the deflecting means comprises a vertical partition in each
- 20 drawer containing the opening or openings and positioned above the opening or openings.
9. A refrigerator unit according to any one of the preceding claims, in which the bottom enclosure member extends 25 beyond both the front and the rear of the upper enclosure member.
10. A refrigerator unit according to claim 9, including a table-top member above that portion of the bottom enclosure member which is in front of the upper enclosure member.
11. The refrigerator units substantially as hereinbefore described with reference to and as illustrated in Fig. 1, 35 Fig. 2, and Figs. 3 and 4 of the accompanying drawings.
- Dated the 2nd day of February, 1945.
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